In the Drawings:

Please permit correction of Figure 3 to be Fig. 3(a) and Fig. 3(b) as shown in red ink on the attached drawings.

REMARKS

Reconsideration of the above-identified patent application in view of the remarks following is respectfully requested.

Claims 1-18 are in this case. Claims 1-3, 7-12 and 16-18 have been rejected under § 103(a). Claims 5-6 and 14-15 have been objected to because of informalities. Claims 4-6 and 13-15 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Examiner's rejection is respectfully traversed.

§ 103(a) Rejections

The Examiner has rejected claims 1-3, 7-12 and 16-18 as being unpatentable over Szeliski et al. (6,044,181), (hereinafter referred to as "Szeliski"). The Examiner's rejection is respectfully traversed.

The Examiner states that regarding claims 1 and 10, Szeliski discloses an apparatus that relates to constructing and rendering panoramic mosaic images from a sequence of still or video images (Szeliski: column 1, lines 9-12). This apparatus comprises "providing a first and second image" (Szeliski: figure 9, items 905 and 910, wherein the pair of images are I0 and I1), "providing an initial estimate of each of the two translation parameters" (Szeliski: column 9, lines 11-13, wherein the two translation parameters are the translation parameters from each (2) input images), "determining the relative global motion between the first and second images using a gradient approach in an iterative process starting with the initial estimate, whereby the gradient approach provides the center of each interval and results in improved global motion convergence" (Szeliski: figures 9-11, wherein the iterative process are the "loopbacks" shown in the figures, column 20, lines 54-67-column 21, lines 1-14, wherein the center of the interval is the center of the patch, the global motion is the global alignment). Although Szeliski fails to show the symmetric and bi-directional gradient approaches as claimed, Szeliski does show a gradient approach which provides the center or optimal location of each interval (Szeliski: column 20, lines 54-67-column 21, lines 1-14, wherein the center of the interval is the center of the patch). Therefore, The Examiner argues that it would have been obvious to one having

ordinary skill in the art at the time the invention was made to implement the symmetric and bi-directional approach in order to obtain an apparatus that operates more efficiently by choosing the best approach for different types of input images.

Applicant respectfully submits that the Examiner's rejection is based on a basic misunderstanding of the word "interval" in claims 1 and 10. Szeliski describes a local refinement scheme that is not based on gradient methods. He improves the quality of the mosaic by dividing the image into 16x16 patches and registering them by correlation. This has no relation to our invention, as recited in the claims, which deals neither with local motion nor with blocks. The "interval" recited in independent claims 1 and 10 is a parameter interval, not an image patch interval. A "patch" is Szelinski is a physical entity (section or part of an image). A "parameter" of the present invention (rotation, translation or zoom) as recited in the claims is not an image patch and it is not a physical entity but an action or input. Each parameter of the present invention has an "interval of values" see e.g. the Abstract. Each parameter is represented by a vector (claims 3, 4, 13 and 14). Therefore, a "center of a parameter interval" as recited in claim 1 is not a center of an image patch, as claimed by the Examiner, but the center of the parameter vector in vector space. It follows that the local alignment scheme presented by Szelinski in column 20, lines 54-67, which refines the quality of the mosaic and does not use any approach is thus totally unrelated and totally immaterial to claims 1 and 10 of the present invention, as it does not refer to a "parameter interval" but to a "patch interval". In summary, the Examiner mistakenly assumes that Szelinski's "patches" are equivalent to our "intervals", that our "point-wise linearization" (claim 2, 11) is equivalent to his "point correspondence" and that our "linearization error" is equivalent (claims 2, 4, 9, 11, 13, 18) to his "misregistration error".

In view of the arguments above, the Applicant respectfully submits that claims 1 and 10 are in condition for allowance.

The Examiner states that regarding claims 2 and 11, Szeliski discloses "providing an initial interval for each translation parameter" (Szeliski: column 20, lines 54-67, wherein the initial interval is the patch), "dividing each parameter interval into two equal or non-equal sub-intervals" (Szeliski: column 20, lines 58-59, wherein the interval is the patch, and the sub-interval is the 16x16 pixels. The Examiner notes

that in certain cases such as image boundaries, the sub-interval size would be unequal), "providing a basic symmetric gradient formulation that includes the sub-intervals" (Szeliski: figure 9, wherein the gradient formulation is the gradient, column 20, lines 58-60, wherein the intervals are the patches), "running in each iteration a point-wise linearization procedure" (Szeliski: column 20, lines 54-56, wherein the point-wise linearization procedure is the point correspondence), and "deriving in each iteration a symmetric linearization error based on the procedure" (Szeliski: column 20, lines 15-20, wherein the linearization error is the misregistration error). Applicant respectfully submits that, since the interval of the independent claims is not a patch, the rejection of claims 2 and 11 is unwarranted, and in view of the argued above with respect to claims 1 and 10, claims 2 and 11 are also in condition for allowance..

The Examiner states that regarding claims 3 and 12, Szeliski discloses "using a motion parameters vector representing the plurality of parameters" (Szeliski: column 9, lines 9-25, column 11, lines 25-27). Since these claims depend indirectly from respectively independent claims 1 and 10, Applicant respectfully submits that they are also in condition for allowance, in view of the arguments presented above.

The Examiner states that regarding claims claims 7 and 16, Szeliski discloses "the global motion is selected from the group consisting from image translation, rotation, affine motion, and panoramic motion" (Szeliski: column 9, lines 32-33, wherein the rotation is the three-dimensional rotation. Since claims 7 and 16 depend directly from respectively independent claims 1 and 10, which are argued to be in condition for allowance, Applicant respectfully submits that claims 7 and 16 are similarly in condition for allowance.

The Examiner further states that regarding claims 8 and 17, Szeliski discloses "improved convergence properties include an improved convergence rate" (Szeliski: column 24, lines 7-9, wherein the improved convergence rate is the quicker convergence). Since claims 8 and 17 depend directly from respectively independent claims 1 and 10, which are argued to be in condition for allowance, Applicant respectfully submits that claims 8 and 17 are similarly in condition for allowance.

The Examiner further states that regarding claims 9 and 18, Szeliski discloses "improved convergence properties include improved linearization error rate" (Szeliski: column 20, lines 34-36, wherein the improved error rate is the reduced

accumulated error). Since claims 9 and 18 depend directly from respectively independent claims 1 and 10, which are argued to be in condition for allowance, Applicant respectfully submits that claims 9 and 18 are similarly in condition for allowance.

Objections

Claims 5-6 and 14-15 have been objected to because of informalities. Applicant has amended these claims to address the objection, by inserting the appropriate equations.

The Examiner has objected to claims 4-6 and 13-15 as being dependent upon a rejected base claim, but which would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In view of the Applicant's arguments that the original base claims should be in condition for allowance, these claims are left unchanged.

De Haan et al, Bober et al and Iu et al cited in said Office Action have been carefully reviewed but are deemed not to anticipate, nor render obvious, either singly or in combination, Applicant's claimed invention, as was properly determined by the Examiner in said Office Action.

In view of the above amendments and remarks it is respectfully submitted that claims 1-18 are in condition for allowance. Prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

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Date: February 28, 2005

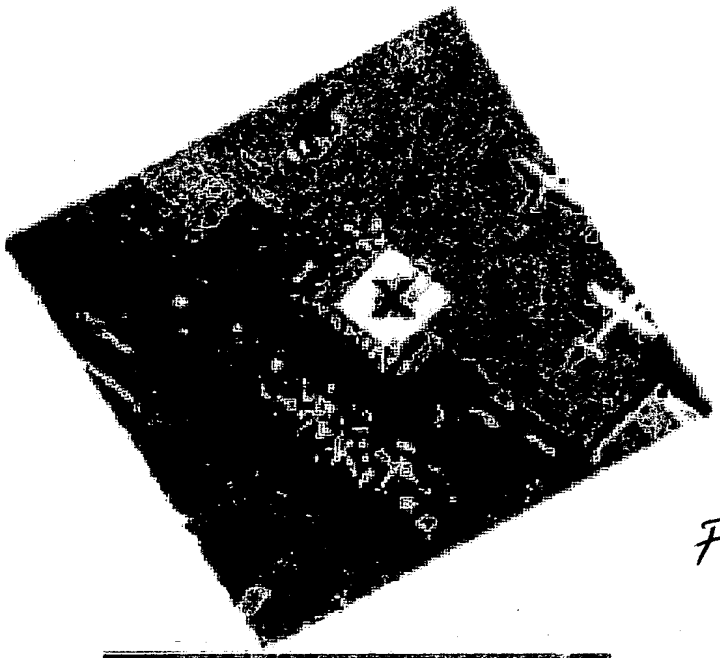

Fig. 3(a)

Fig. 3(b)

~~Figure 3~~